

REMARKS:

- 1) Referring to item 10) of the Office Action Summary, the Examiner is respectfully requested to indicate in the next official communication, that the original Formal Drawings filed on November 20, 2003 have been accepted.
- 2) The Examiner's attention is directed to an Information Disclosure Statement filed on May 24, 2005. Please consider the references and return an initialed, signed and dated acknowledgment copy of the IDS Form PTO-1449 of May 24, 2005.
- 3) The claims have been amended as follows.

Claims 5 to 7 and 10 to 12 have been amended editorially to use the terminology "solid resin material" consistently throughout. This amendment does not introduce any new matter, and does not narrow or substantively change the scope of the claims, because the same claim feature is being defined. Namely, the "resin material" was initially introduced as a "solid resin material", and there is no "resin material" other than the "solid resin material" referred to in the claims. The present amendment merely achieves better consistency and completeness of the terminology.

Independent claim 1 has been amended to make clear that the melted resin is generated solely by melting the solid resin material in the mold cavity, that the melted resin is set in the mold cavity to produce a set resin only from the melted resin that was generated from the solid resin material in the mold

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cavity, and that the electronic component is encapsulated in this set resin that is produced only from the original solid resin material. These features are merely clarifications of the intended subject matter of claim 1, and are supported by the original disclosure of all of the drawing figures and the written description (for example see page 3 lines 2 to 17).

Independent claim 5 has been amended to make clear that the melted resin is generated only by heating and melting only a solid resin material in the mold cavity, and that the resin mold product is formed by setting only the melted resin that was generated from the solid resin material in the mold cavity. This amendment is a clarification of the intended subject matter of the claim, and is supported by the original disclosure of the drawing figures and the written description (for example see page 3 line 31 to page 4 line 5).

Independent claim 9 has been amended to make clear that the solid resin material is adapted, sized and shaped so as to encapsulate the electronic component in only the melted resin that is produced from the solid resin material, and so that a volume of the melted resin produced only from the solid resin material entirely fills a remaining space around the board and the electronic component in the cavity, and that only the melted resin encapsulates the electronic component. This feature is supported in the original drawings (see Figs. 2a, 2b and 5b) and the original written description (see page 3 lines 8 to 12, and page 4 lines 1 to 5 and 18 to 29).

In view of the above mentioned original support, the claim amendments do not introduce any new matter. Entry and consideration of the claim amendments are respectfully requested.

- 4) Referring to section 2 on pages 2 to 3 of the Office Action, the objection to claims 5 to 7 and 10 to 12 has been taken into account in the present claim amendment. The Examiner's suggestion for amending the claims has been adopted. Please withdraw the objection.
- 5) Referring to section 4 on pages 3 to 5 of the Office Action, the rejection of claims 5 to 11 (and 12?) as anticipated by JP 05-198707 (Takado) is respectfully traversed. This rejection will be discussed separately in connection with the two rejected independent claims 5 and 9.
- 6) Takado discloses a method of resin-encapsulating an electronic component.

In the disclosed method, a solid irreversible thermosetting resin is placed into a lower metal mold, and then the mold is heated so as to liquify this resin. An electronic component is placed onto the liquified resin in the lower mold. Then, an upper mold is closed and sealed, and a second liquid resin is injected into the closed mold cavity formed by the upper mold. The second resin material has been produced in a liquid state outside of and remotely from the mold cavity, and then has been injected into the mold cavity through a runner and gate (9).

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Thus, the final molded product including the electronic component encapsulated in resin is produced from two distinct resin portions, namely the first resin produced by melting the solid resin material in the mold cavity, and the second resin that is injected in a liquid state from outside into the mold cavity through the gate (9).

Such an injection of a liquid resin from outside into the mold cavity is particularly to be avoided by the present invention (see the present specification at page 2 lines 3 to 22). That is achieved according to the invention as defined in the claims, which will be discussed below.

- 7) **Present independent claim 5** is directed to a method of resin-encapsulating an electronic component.

The claimed method involves placing a solid resin material on a main surface of a board in a mold, and generating a melted resin to enclose an electronic component on the board only by heating and melting only the solid resin material in the mold cavity. The method further involves forming a resin mold product by setting only the melted resin that was generated from the solid resin material in the mold cavity.

Present claim 5 excludes injection of a second liquid resin into the mold cavity from outside of the cavity. Present claim 5 also excludes forming a resin mold product to encapsulate the electronic component by setting an additional second liquid resin provided from outside of the mold cavity.

Namely, present claim 5 makes clear that the inventive method produces the melted resin only from the solid resin

material inside the mold cavity and forms the resin mold product by setting only the melted resin that was generated from the solid resin material inside the mold cavity. Thus, present claim 5 is not anticipated by Takado.

Moreover, Takado would have provided no suggestion to omit the introduction of a second liquid resin from outside of the mold cavity, because that would have been directly contrary to the particular required teachings, purposes and objects of Takado. Namely, the whole point of Takado is to provide two quantities or portions of resin in two different manners, such that the two resins together form the encapsulation of the resin molded product. One of those two resin portions is purposely injected in the liquid state from outside of the mold cavity into the mold cavity. That would not have given any suggestion toward forming a resin molded product by setting only a melted resin that was generated only from a solid resin material in the mold cavity.

- 8) **Present independent claim 9** is directed to a solid resin material that is adapted sized and shaped to cooperate with a mold cavity in a resin-encapsulating method.

Particularly, the solid resin material has such a size and such a shape that it can be melted to form a melted resin so that only the melted resin will encapsulate the electronic component, and so that a volume of the melted resin produced only from the solid resin material in the mold cavity entirely fills a remaining space around the board and the electronic component in

the mold cavity, and only this melted resin encapsulates the electronic component.

The teachings of Takado are directly contrary. Namely, Takado provides a solid resin material that must necessarily have such a size, shape and volume to only partially fill the mold cavity around the electronic component and the board. This is necessary because Takado expressly requires a second liquid resin to be injected into the remaining empty space of the mold cavity after the solid resin material has been melted in the mold cavity. Thus, present independent claim 9 is not anticipated by Takado.

Moreover, the present invention would not have been obvious from the reference, because there would have been no suggestions to do exactly the opposite of the special required teachings of Takado, namely to provide a solid resin material having such a volume so as to only partially fill the mold cavity with the resulting in situ melted resin and then to supply an additional quantity of liquid resin to fill the rest of the mold cavity. The contrary feature of the invention, whereby the solid resin material has a size, shape and volume so that the melted resin produced from it entirely fills the remaining space in the mold cavity, would have rendered the teachings of Takado completely impossible and non-functional for the intended purpose.

- 9) For the above reasons, the Examiner is respectfully requested to withdraw the rejection of claims 5 to 11 (and 12?) as anticipated by Takado.

10) Referring to section 6 on pages 6 to 7 of the Office Action, the rejection of claims 1 to 4 as obvious over Takado in view of US Patent 6,081,978 (Utsumi et al.) is respectfully traversed. The pertinent disclosure of Takado has been discussed above. The further combination of Takado with Utsumi et al. will be discussed in comparison to present claim 1.

11) **Present independent claim 1** is directed to a method of resin-encapsulating an electronic component.

The claimed method involves generating a melted resin in a mold cavity solely by melting a solid resin material in the mold cavity. Then, the method further involves setting the melted resin in the cavity to produce a set resin only from the melted resin that was generated from the solid resin material in the cavity. This set resin encapsulates the electronic component to form a molded product.

Similarly as discussed above in connection with claim 5, the requirements of claim 1 are also contrary to the disclosure of Takado. Takado does not produce a set resin only from a melted resin that was generated from a solid resin material in the mold cavity.

Takado produces a first quantity or portion of melted resin by melting a solid resin in the mold cavity, and additionally injects a second liquid resin from outside of the mold cavity into the mold cavity. Thus, the overall set resin that encapsulates the electronic component is **not** produced only from the melted resin generated from the solid resin in the mold cavity, but rather involves the in-cavity melted resin plus the

second liquid resin that was introduced from outside of the mold cavity.

Regarding the further combination of Utsumi et al. with Takado, there is nothing in the disclosure of Utsumi et al. that would have drastically modified the teachings of Takado toward the present invention. According to Utsumi et al., a liquid resin is injected into the cavity from outside of the cavity through runners and gates (131d, 131e) (see col. 1 line 64 to col. 2 line 7, col. 4 line 46, col. 7 line 18, col. 9 lines 6 to 10, col. 10 lines 1 to 3, col. 12 lines 27 to 35). Thus, the pertinent teachings of Utsumi et al. are directly contrary to the present invention, and would only have motivated the ordinarily skilled artisan to modify Takado by doing away with the in-cavity melted resin, to provide only the externally injected liquid resin. Such a result would not have suggested the present invention, but rather would have been even farther off-point.

- 12) For the above reasons, the Examiner is respectfully requested to withdraw the rejection of claims 1 to 4 as obvious over Takado in view of Utsumi et al.
- 13) Referring to section 7 on pages 7 to 8 of the Office Action, the rejection of claim 13 as obvious over Takado in view of Utsumi et al. and further in view of JP 01-097622 (Kawai et al.) is respectfully traversed. Claim 13 depends from claim 1, which has been discussed above in comparison to the Takado and Utsumi et al. The teachings of Kawai et al. relating to transporting a resin sheet to a vacuum forming station would not have

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supplemented Takado and Utsumi et al. in a manner that would have suggested the significant features of claim 1 discussed above. Thus, dependent claim 13 would not have been obvious, and the Examiner is respectfully requested to withdraw this rejection.

- 14) The additional prior art made of record requires no particular comments because it is not been applied against the claims.
- 15) Favorable reconsideration and allowance of the application, including all present claims 1 to 13, are respectfully requested.

Respectfully submitted,
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